Marand Electric Solar Car In-Wheel Motors

Solar Car Wheel Motor Information Sheet

Marand Precision Engineering is now offering a complete Solar Car Wheel Motor incorporating Marand's very high efficiency Axial Flux Permanent Magnet Motor. The motor is based on the solar car motor designed by the CSIRO and now licensed to Marand.

The motor is intended to be a complete turn key solution for solar car teams who want a quick and simple drive solution for their vehicle.

Every component of the 40 pole wheel motor has been designed with high efficiency in mind, minimising all sources of electrical, aerodynamic and mechanical losses in the system. The electro-mechanical components of the motor are precision manufactured from high performance Neodymium magnets and high temperature Litz wire to maximise efficiency and power. The wheel design incorporates the latest low friction energy efficient bearings from SKF and internal windage reduction to further minimise losses in the system.

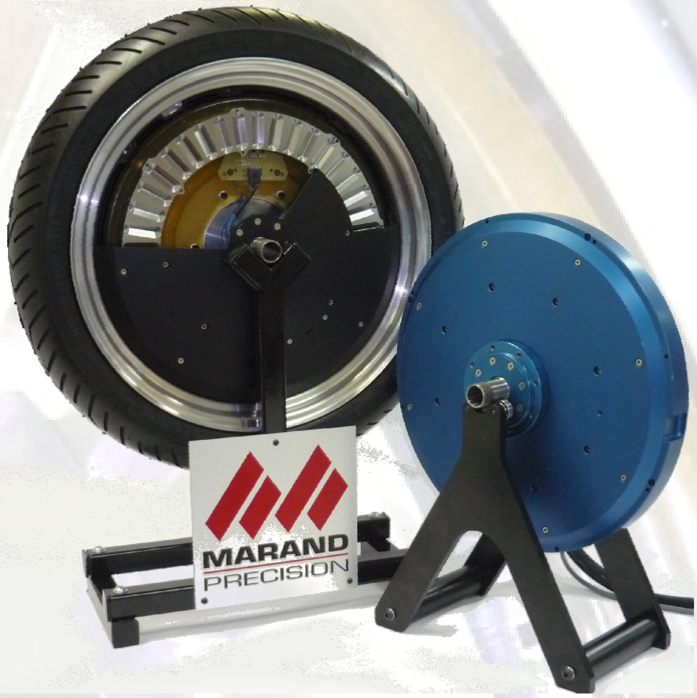

Figure 1 – Marand wheel motor, with and without rim

The wheel has been designed for high strength and low weight, and eliminates the need for a drive train and the associated energy losses. Its low mass can be attributed to eliminating any material which is not absolutely required to maintain the performance of the motor. The performance characteristics of the motor are given in table 1 below.

Table 1. Motor Performance Characteristics		
Rated Power	1800 W	
Nominal Speed	1060 RPM	
Nominal Torque	16.2 Nm	
Continuous Torque	42 Nm	(5.0 kW)
Peak Torque	80 Nm for 120s	(10 kW)
Motor Efficiency @ Nominal	**98.3%**	
Wheel Losses (Bearings, Windage)	18.8 W	
Mass	15.40 kg	

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The stator windings have no iron core, and extensive weight reduction is carried out on the magnet backing plates in areas of low magnetic flux. The Motor Frame has been CNC machined out of aerospace grade aluminium to be lightweight and maintain its strength under the high magnetic loads and driving forces. The design keeps the entire mass of the wheel below 16kg.

The three piece motor frame design, developed by Marand, allows for use with both the 3” Michelin tyres and 1.6” Dunlop tyres, common in solar car racing. The removable rim has significant advantages over an integral rim. In the event of tyre blow-out or a severe impact which can damage the rim, only the rim will need to be replaced, not the entire motor frame, significantly reducing the cost of replacement parts.

The motor is supplied with all components to be assembled onto the solar car including wiring harness for both power and controls, and three inductors usually necessary for connection between your chosen motor controller and the motor.

The motor is supplied fully tested on Marand’s custom built dynamometer, and issued with a test certificate

Pricing for the complete wheel motor is $26,000 AUD and is available in a range of colour anodised finishes. Contact Marand now to place an order.

Note: Prices and specifications are subject to change without notice. The motor is supplied to order Ex Works, Melbourne, Australia.

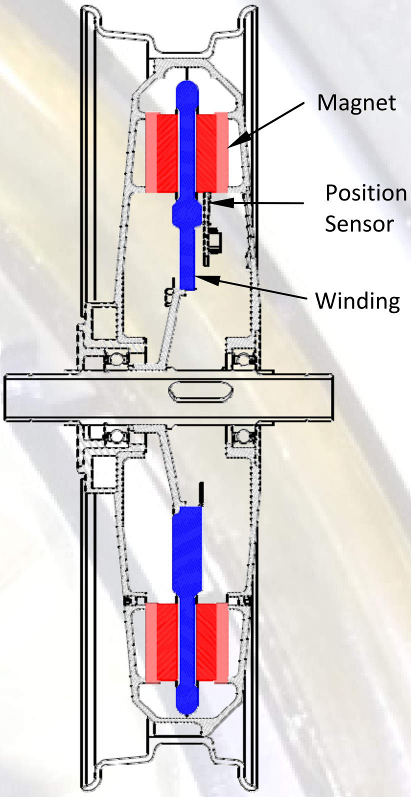

Figure 2 – Cross section of wheel motor showing active components